

THE NORTH AMERICAN SPECIES OF THE GENERA
LEUCOPHORA ROBINEAU-DESVOIDY AND
PROBOSCIMYIA BIGOT (MUSCIDÆ,
DIPTERA)

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The genus *Leucophora* Robineau-Desvoidy¹ belonging to the subfamily Anthomyiinae is of particular interest to students of insect life on account of the fact that the larvæ, so far as is known, live asinquilines² or parasites³ in the nests of solitary bees and wasps. It is recorded that the flies of many of the species belonging to this genus have the habit of shadowing bees and wasps as the latter approach their burrows, which are situated in sandy or gravelly soils.⁴ In this way the nests of hymenopterous hosts are probably detected by the female for purposes of oviposition. Despite these peculiar habits the adults of the group are not to be readily distinguished on the basis of generic characters from many species occurring in allied groups associated with *Hylemyia sens.-lat.* The flies of the genus *Leucophora* differ principally but not invariably by having the genal, facial and occipital regions of the head more buccate, interfrontalia in female narrower, frons in this sex approaching the proportions of that in male. The thorax is robust and abdomen in male conical and rarely longer than thorax, ovipositor armed with recurrent spines on anal palpi except in *maculata*, legs proportionately stout, wings with costal thorns vestigial, *m-cu* cross veins in many species

¹ In the sense of *Hylephila* and *Hammomyia* (Rondani) Coquillett. Proc. U. S. Nat. Mus., 1910 XXXVII p. 560.

² Huie, L. H. The habits and life history of *Hylemyia grisea* Fall., an anthomyid fly new to the Scottish fauna. The Scottish Naturalist, 1916 No. 49 Jan. p. 13-20.

³ Séguy, E. Contribution a l'étude des diptères anthomyides du genre *Hylephila*. Comptes rendus du Congrès des Sociétés savantes en 1925, 1926 p. 474.

⁴ Collin, J. E. A contribution towards the knowledge of the anthomyid genera *Hammomyia* and *Hylephila* of Rondani (Diptera). Trans. Ent. Soc. London, 1921 Pt. 111 p. 305-326.

oblique and sinuate and veins *R.*₄₊₅ and *M.*₁₊₂ convergent distad. Hypopygium and copulatory appendages in male of normal structure, not shining; in both sexes the apical scutellar setulæ are more robust than those of *Prosalpia*. The arbitrary nature of such a combination of characters may, without further knowledge, serve only to confuse rather than to clarify the definition of the genus. Undoubtedly one of the most important sources of information relating to the scope of the genus is to be found in the facts concerning the peculiar habits of the species.

Most authors have treated the group as composed of two segregates, and have applied to them Rondani's names *Hylephila* and *Hammomyia* respectively. In dealing with North American species this classification seems scarcely practical owing to the intergrading of many of the characters proposed for the separation of the different segregates. I have been unable to find additional characters that might help to support Rondani's action, and hence have assembled the species into one genus under the name *Leucophora* Robineau-Desvoidy, as proposed earlier by Coquillett.⁵

The following species are recorded as occurring in North America:⁶

- Leucophora albiseta* (von Roser)
johnsoni (Stein)
maculata (Stein)
marylandica (Malloch)
obtusa (Zetterstedt)
sociata (Meigen)
unilineata (Zetterstedt)
unistriata (Zetterstedt)
fusca n. sp.
anneza, n. sp.

Genus *Leucophora* Robineau-Desvoidy

- Leucophora* Robineau-Desvoidy, Essai Myod., 1830 p. 562 . . .
 Coquillett, Jour. N. Y. Ent. Soc., 1901 IX p. 138 . . .
 Coquillett, Proc. U. S. Nat. Mus., 1910 XXXVII p. 560.

⁵ Loc. cit., p. 560.

⁶ *Hammomyia setigera* Johannsen (Trans. Amer. Ent. Soc., 1916 XLII p. 387) belongs to *Hylemyia*, being closely related to *H. inornata* Stein.

- Chortophila Macquart, Hist. Nat. d. Ins. 1835 II p. 328 . . .
 Meade, Descr. List Brit. Anth., 1897 II p. 43.
- Anthomyia Schiner, Faun. Austr., 1862 I p. 638.
- Hylephila Rondani not Billberg, Dipt. Ital., Prodr., 1877 VI p. 13, 233 . . . Strobl, Verh. zool.-bot. Ges. Wien, 1893 XLIII p. 263 . . . Schnabl and Dziedzicki, Abh. K. Leop.-Carol. Deutsch. Akad. Naturforsch., 1911 XCV Nr. 2 p. 91 . . . Stein, Arch. f. Naturgesch., 1916 (1915) LXXXI A heft 10 p. 158, 222 . . . Johannsen, Trans. Amer. Ent. Soc., 1916 XLII p. 388 . . . Stein, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84 . . . Collin, Trans. Ent. Soc. London, 1921 Pt. III p. 311, 306 . . . Séguy, Faune de France, 1923 VI p. 72 . . . Séguy, Compt. Congr. Soc. Savantes, 1926 p. 473 . . . Karl, Tierwelt Deutschlands, 1928 XIII Pt. 3 p. 192 . . . Malloch, Diptera of Patagonia, 1934 Pt. VII fasc. 2 p. 187 . . . Séguy, Gen. Insect., 1937 Fasc. 205 p. 135.
- Hammomyia Rondani, Dipt. Ital., Prodr., 1877 VI p. 13, 236 . . . Strobl, Verh. zool.-bot. Ges. Wien, 1893 XLIII p. 265 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No. 1444 p. 554 . . . Stein, Kat. Paläark. Dipt., 1907 III p. 698 . . . Williston, Man. N. A. Dipt., 3rd ed., 1908 p. 336 . . . Schnabl and Dziedzicki, Abh. K. Leop.-Carol. Deutsch. Akad. Naturforsch., 1911 XCV Nr. 2 p. 91 . . . Stein, Arch. f. Naturgesch., 1914 (1913) LXXIX A heft 8 p. 32 . . . Stein, Arch. f. Naturgesch., 1916 (1915) LXXXI A heft 10 p. 163, 222 . . . Johannsen, Trans. Amer. Ent. Soc., 1916 XLII p. 387 . . . Stein, Arch. f. Naturgesch., 1919 (1917) LXXXIII A heft 1 p. 152 . . . Stein, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84 . . . Malloch, Canad. Ent., 1921 LIII p. 78 . . . Collin, Trans. Ent. Soc. London, 1921 Pt. III p. 306, 307 . . . Séguy, Faune de France, 1923 VI p. 70 . . . Hockett, Mem. 77 N. Y. (Cornell) Agr. Exp. Sta., 1924 (1923) p. 13 . . . Karl, Tierwelt Deutschlands, 1928 XIII Pt. 3 p. 191 . . . Malloch, Diptera of Patagonia, 1934 Pt. VII Fasc. 2 p. 189 . . . Curran, Fam. Gen. N. A. Dipt., 1937 p. 391.
- Anthomyia (Hammomyia) Pandellé, Rev. ent. France, 1901 XX p. 203, 299.

Genotype *Leucophora cinerea* Robineau-Desvoidy (= *Aricia albescens* Zetterstedt).

The genus *Leucophora* was described by Robineau-Desvoidy (1830)⁷ for the reception of five nominal species, none of which have since been recognized with any degree of confidence by subsequent authors. A careful study of the original description of genus and species has led me to the conclusion that the same general group is here depicted that was later to be described by Rondani as two segregates.

Macquart (1835) apparently did not recognize Robineau-Desvoidy's genus, and forthwith cited the first four species of *Leucophora* as a part of his heterogeneous group *Chortophila*.

Rondani (1877) in dealing with the classification of Italian diptera erected the allied genera *Hylephila* and *Hammomyia*, and designated *Musca buccata* Fallén as the type of the former genus and *Aricia albescens* Zetterstedt as the type of the latter. In the case of *albescens* the author included in synonymy the species *Leucophora cinerea* Robineau-Desvoidy.

Coquillett (1901) in a preliminary list of the types of anthomyid genera designated *L. cinerea*, the third of five original species, as the genotype of *Leucophora*. Stein (1907) in his catalogue of palæartic diptera cited *Leucophora* and *Hylephila* as synonyms of *Hammomyia* Rondani, and recorded *cinerea* and *albescens* among the synonyms of *Hammomyia albisetæ* (von Roser). Coquillett (1910) in his later compilation of the type species of North American genera of Diptera included both of Rondani's genera as synonyms of *Leucophora*, accepting the name *Leucophora cinerea* in the sense of *Aricia albescens* Zetterstedt.

Subsequent authors (Stein, 1916, 1920) (Collin, 1921) (Séguy, 1923, 1925) (Malloch, 1921, 1934) (Karl, 1928) have maintained in a large measure the classification proposed by Rondani, although some doubt has been expressed concerning the validity of *Hylephila* as a name for one of the genera, owing to its possible preoccupation in *Lepidoptera*.

⁷ Citations of literature are given in abbreviated form in the synonymy, the year of publication being inserted within parentheses.

Séguy (1937) in his recent monograph on the Muscidæ of the world combined both of Rondani's segregates into one genus under the name *Hylephila Rondani*.

In my opinion the name *Leucophora* was rendered valid by Coquillett's action in designating *Leucophora cinerea* Robineau-Desvoidy as the type of the genus. I have regarded the identity of *cinerea* as equivalent to that of *Aricia albescens* Zetterstedt, according to the concensus of opinions expressed in the literature. Zetterstedt's species is the genotype of *Hammomyia Rondani*, and on that account I have considered *Hammomyia* as a synonym of *Leucophora*. I have come to the conclusion that the generic name *Hylephila* as used by Rondani cannot stand owing to its preoccupation by Billberg.⁸ If Rondani's group is to be maintained it seems that a new name should be proposed to displace *Hylephila*. This genus possesses priority over *Hammomyia*, hence in any attempt to merge the two groups it would appear that the name *Hammomyia* would be sunk in synonymy. However in my opinion the need for a new name does not arise, if for no other reason than the fact that there already exists the prior claims of *Leucophora Robineau-Desvoidy*.

I have not thought it advisable, at least for the purposes of this study, to make any further reference concerning the possible status of the remaining species described in *Leucophora* because of lack of evidence or authority regarding their probable identity for specific purposes.

⁸ The name *Hylephila* was employed firstly in 1820 by Billberg (*Enumeratio Insectorum in Museo Billberg*, 1820 p. 81) to denote a genus in Lepidoptera. Although the validity of Billberg's genera has been indirectly questioned by Walsingham and Durrant (*Revision of the nomenclature of micro-lepidoptera*. *Ent. Month. Mag.*, 1902 XXXVIII p. 163-170) and later by others on account of the unfortunate circumstances surrounding Billberg's work these authors evidently did not take into consideration the attempt made by Scudder (*Historical sketch of the generic names proposed for butterflies: A contribution to systematic nomenclature*. *Proc. Amer. Acad. Arts Sciences*, 1875 X p. 193) to revive Billberg's genus *Hylephila*. In Scudder's treatment of the genus the names of three original species are retained, of which *Papilio phylæus* Drury is selected as the genotype of *Hylephila*. The authorship of the genus is credited to Billberg. In my opinion this action served to validate the name *Hylephila Billberg* for the group.

KEY TO MALES

1. Mid tibia with a bristle on anteroventral or mid ventral surface 2
- Mid tibia with no bristle on either ventral surface 7
2. Notopleural callosity with several setulae 3
- Notopleural callosity devoid of setulae 4
3. Scutellum fuscous on lateral and ventral surfaces; lower caudal sternopleural bristle weakly developed *fusca* n. sp.
- Scutellum uniformly grayish on lateral and ventral surfaces; lower caudal sternopleural bristle stoutly developed *annexa* n. sp.
4. Tibiæ, parafacials and cheeks normally largely reddish; arista hairs longer than basal diameter of arista; prealar bristle absent; cross veins cloudy; cruciate setulae present *johnsoni* (Stein)
- Tibiæ normally largely blackish; arista minutely pubescent or bare; cross veins clear 5
5. Mid tibia with a bristle on anteroventral surface; fore tibia with a robust apical posterodorsal bristle; cruciate setulae present.
unilineata (Zett.)
- Mid tibia with a bristle on mid ventral surface; fore tibia lacks a robust apical posterodorsal bristle; cruciates absent 6
6. Prealar bristle as long as posterior notopleural bristle; planes of dorsocentral and acrostical bristles usually noticeably setulose; abdominal vitta blackish *obtusa* (Zett.)
- Prealar bristle shorter than posterior notopleural bristle, or absent; planes of dorsocentral and acrostical bristles not noticeably setulose; abdominal vitta brownish *unistriata* (Zett.)
7. Prealar bristle present 8
- Prealar bristle usually absent 11
8. Notopleural callosity with several setulae; parafacials broader ventrad than at base of antennæ; proboscis slender *annexa* n. sp.
- Notopleural callosity invariably devoid of setulae; parafacials broader at base of antennæ and narrower ventrad; proboscis not slender 9
9. Processes with a fringelike series of long bristles from base to apex that is ventrally directed; prealar bristle short *maculata* (Stein)
- Processes with no pronounced series of longish bristles directed ventrad, if long directed caudad; prealar bristle as long as posterior notopleural bristle 10
10. Bristles on inner border of processes short and stiffish, stouter developed than bristles on outer border (fig. 13); bristles on antero- and posteroventral surfaces of hind femur not longer than greatest breadth of femur *albiseta* (von Roser)
- Bristles on inner border of processes fine and slender, not stouter developed than those on outer border (fig. 15); bristles on antero- and posteroventral surfaces of hind femur longer than greatest breadth of femur *sociata* (Meigen)
11. Arista hairs longer than basal diameter of arista; tibiæ reddish tinged; processes with no noticeable series of bristles directed ventrad 12

- Arista hairs not longer than basal diameter of arista; tibiae black; processes with a noticeable series of downwardly directed bristles.
maculata (Stein)
- 12. Processes reddish yellow; mid tibia with apical anterodorsal bristle more robust than apical posterodorsal; *m-cu* cross vein usually cloudy and semierect *johnsoni* (Stein)
- Processes blackish; mid tibia with apical posterodorsal bristle more robust than apical anterodorsal; *m-cu* cross vein clear and usually obliquely directed *marylandica* (Malloch)

KEY TO FEMALES

1. Mid tibia with a bristle on anteroventral or mid ventral surface 2
- Mid tibia with no bristle on either ventral surface 7
2. Tibiæ reddish yellow; cross veins cloudy; arista hairs longer than basal diameter of arista *johnsoni* (Stein)
- Tibiæ blackish; cross veins clear; arista hairs not longer than basal diameter of arista 3
3. Notopleural callosity with several setulae 4
- Notopleural callosity devoid of setulae 5
4. Scutellum fuscous on lateral and ventral surfaces; fore tibia with at least three well developed apical bristles; setulae on mesopleura encroaching cephalad onto declivity dorsad of mesothoracic spiracle *fusca* n. sp.
- Scutellum grayish on lateral and ventral surfaces, concolorous with dorsum; fore tibia with two well developed apical bristles; mesopleural setulae not encroaching onto declivity dorsad of mesothoracic spiracle *annexa* n. sp.
5. Fore tibia with a robust apical posterodorsal bristle; mid tibia with bristle on anteroventral surface; cruciate setulae present; outer pair of verticals bristlelike *unilineata* (Zett.)
- Fore tibia lacks a robust apical posterodorsal bristle; mid tibia with bristle on mid ventral surface; cruciates absent; outer pair of verticals setulose 6
6. Prealar bristle as long as posterior notopleural bristle; abdominal vitta blackish; first abdominal sternum with several setulae; middle four bristles of marginal series on tergum 5 situated further from caudal margin than those laterad *obtusa* (Zett.)
- Prealar bristle shorter than posterior notopleural bristle, or absent; abdominal vitta brownish; first abdominal sternum bare; middle four bristles of marginal series on tergum 5 situated about the same distance from margin as those laterad *unistriata* (Zett.)
7. Prealar bristle present 8
- Prealar bristle usually absent 9
8. Palpi flattish, narrowly spatulate; hind femur with a stoutish bristle on posteroventral surface *sociata* (Meigen)
- Palpi slender, filiform; hind femur with no stoutish bristle on posteroventral surface *albisetata* (von Roser)

9. Frons at narrowest about equal to one-third width of head viewed from above; aristal hairs longer than basal diameter of arista; ovipositor armed with recurrent spines on anal palpi *marylandica* (Malloch)
 - Frons less than one-third width of head; arista minutely pubescent; ovipositor lacks recurrent spines on anal palpi (figs. 19, 20).

maculata (Stein)

Leucophora albisetata (von Roser)

- Leucophora cinerea* Robineau-Desvoidy, Essai Myod., 1830 p. 563 . . . Coquillett, Jour. N. Y. Ent. Soc., 1901 IX p. 138
 . . . Coquillett, Proc. U. S. Nat. Mus., 1910 XXXVII p. 560.
Chortophila cinerea Macquart, Hist., Nat. d. Ins., 1835 II p. 328.
Anthomyia albisetata von Roser, Württemb. Corrb., 1840 I p. 59.
Aricia albescens Zetterstedt, Dipt. Scand., 1845 IV p. 1520.
Anthomyia albescens Schiner, Faun. Austr., 1862 I p. 638 . . . Neuhaus, Diptera marchica, 1886 p. 228.
Hammomyia albescens Rondani, Dipt. Ital., Prodr., 1877 VI p. 236 . . . Strobl, Verh. zool.bot. Ges. Wien, 1893 XLIII p. 265 . . . Collin, Trans. Ent. Soc. London, 1921 Pt. III p. 308
 . . . Séguy, Faune de France, 1923 VI p. 71 . . . Karl, Tierwelt Deutschlands, 1928 XIII Pt. 3 p. 191.
Chortophila albescens Meade, Ent. Month. Mag., 1882 XIX p. 146 . . . Meade, Deser. List Brit. Anth., 1897 II p. 44.
Anthomyia (Hammomyia) albescens Pandellé, Rev. Ent. France, 1901 XX p. 300.
Hammomyia albisetata Stein, Kat. Paläark, Dipt., 1907 III p. 698 . . . Schnabl and Dziedzicki, Abh. K. Leop.-Carol. Deutsch. Akad. Naturforsch., 1911 XCV Nr. 2 p. 91 . . . Stein, Arch. f. Naturgesch., 1914 (1913) LXXIX A heft 8 p. 32 . . . Stein, Arch. f. Naturgesch., 1916 (1915) LXXXI A heft 10 p. 163 . . . Tiensuu, Acta Soc. Faun. Flor. Fenn., 1935 LVIII No. 4 p. 14.
Hylephila albisetata Séguy, Gen. Insect., 1937 Fasc. 205 p. 136.
 Records:-
 Alaska, 2♂, Fairbanks, July 1 1921 (J. M. Aldrich).
 British Columbia, 3♂, Nicola, June 27 1923 (C. B. D. Garrett); 1♂, Seton Lake, Lillooet, June 2 1926, 2♂, June 4 1926 (J. McDunnough).
 California, 1♀, Felton, St. Cruz Mts., 300-500 ft., May 15-19 1907, (J. C. Bradley).

Colorado, 1♂, 1♀, Campus of University of Colorado, Boulder, July 1910, (T. D. A. Cockerell).

Idaho, 1♀, Clementsville, July 22 1926 (R. W. Haegele).

Nova Scotia, 1♂, Kentville, Aug. 14 1917.

Oregon, 1♀, Kiger's Island, June 11 1925 (J. Wilcox).

Washington, 3♂, Clarkston, June 12 1930 (J. M. Aldrich)
[U. S. N. M.]

The male of *albiseta* has been commonly characterized as having a plain dove gray color on thorax and whitish dust on frontal regions of head. The above specimen from Nova Scotia is typical in these respects, but those from Alaska and British Columbia possess a much darker aspect and resemble in many ways the allied species *sociata* (Meigen). If it were not for the structure of the copulatory appendages (figs. 1, 12, 13) and for the fact that many of the species represented in this study exhibit a similarly wide range in tonal forms it would be a difficult matter to reconcile the fact that these western specimens represented the same species as the dove gray examples of *albiseta* from Europe. The female of *albiseta* has the palpi filiform, whereas in *sociata* they are narrowly spatulate in this sex.

Leucophora johnsoni (Stein)

Hylemyia johnsoni Stein, Berl. Ent. Zeitschr., 1898 (1897) XLII p. 215 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI p. 552 . . . Britton, Bull. 31 Conn. Geol. Nat. Hist. Surv., 1920 p. 198 . . . Johnson, Occ. Pap. Boston Soc. Nat. Hist., No. VII 1925 p. 234.

Hammomyia johnsoni Stein, Arch. f. Naturgesch., 1919 (1917) LXXXIII A heft 1 p. 152 . . . Stein, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84 . . . Malloch, Canad. Ent., 1921 LIII p. 78 . . . Hockett, Mem. 77 N. Y. (Cornell) Agr. Exp. Sta., 1924 (1923) p. 13 . . . Hallock and Parker, Circ. 103 N. J. Dept. Agr., 1926 p. 16.

Hylephila johnsoni Séguéy, Gen. Insect., 1937 Fasc. 205 p. 138.
Records:—

Idaho, 2♂, Mt. Moscow, June 1924 (J. M. Aldrich) [U. S. N. M].

New York, 1♂, Glen Head, Long Island, April 14 1921; 13♂, 1♀, Valley Stream, Long Island, April 27 1921; 3♂, Lake-

ville, Long Island, May 22 1921; 1♀, Babylon, Long Island, May 22 1933, 1♀, June 15 1935 (F. S. Blanton); 3♂, Heckscher State Park, Long Island, May 30 1935, 1♀, Babylon, Long Island, May 24 1934, 1♂, May 22 1935, 1♂, May 26 1935, 1♀, June 9 1934, 1♀, June 15 1934, 1♂, Half Way Hollow Hills, Long Island, May 18 1935 (Blanton & Borders); 4♂, Middle Island, Long Island, May 30 1931; 1♀, Riverhead, Long Island, May 27 1934, 1♂, June 26 1927; 1♂, 1♀, Ithaca, May 28 1922.

Ontario, 1♂, Niagara Glen, June 23 1926, 1♀, June 24 1926 (G. S. Walley).

Quebec, 1♀, Covey Hill, June 15 1927 (G. S. Walley).

Texas, 2♂, College Station, April 13 1935, 2♂, April 18 1935, 1♀, April 10 1932, 1♂, April 21 1936 (R. J. Reinhard).

The typical form of *johnsoni* may be described as possessing yellowish tibiae, cloudy cross veins, longish aristal pubescence, but lacking the prealar bristle. There are however specimens which differ in one or more respects to the above combination of characters. In occasional examples the cross veins may be clear and the presence or absence of prealar bristle difficult to determine on account of the development of setae in this region. In the male type, which is preserved in the collections of the Field Museum of Natural History, the mid tibia possesses a mid ventral bristle. This character is lacking in most of the above male specimens, but is present in the female sex. I have tentatively regarded the two male specimens from Idaho as aberrant forms of this species. In these specimens the fore and mid tibiae are largely blackened, arista apparently subnude, abdomen grayish drab, and aedeagus not conforming in structural details to that of eastern examples of *johnsoni*. The proper status of such specimens may be more confidently determined on the examination of a larger series of specimens from western States.

Leucophora marylandica (Malloch)

Hammomyia marylandica Malloch, Trans. Amer. Ent. Soc., 1920 XLVI p. 185 . . . Malloch, Canad. Ent., 1921 LIII p. 78 . . . Hockett, Mem. 77 N. Y. (Cornell) Agr. Exp. Sta., 1924 (1923) p. 14 . . . Hallock and Parker, Circ. 103 N. J. Dept. Agr., 1926 p. 16.

Hylephila marylandica Johnson, Occ. Pap. Boston Soc. Nat. Hist., No. VII 1925 p. 236 . . . Johnson, Insect. Faun. Biol. Surv. Mt. Desert Region, 1927 p. 211 . . . Séguy, Gen. Insect., 1937 Fasc. 205 p. 138.

Records:—

Alberta, 1♀, Waterton, July 8 1923 (H. L. Seamans).

British Columbia, 1♀, Kaslo, June 18 — (R. P. Currie)
[U. S. N. M.]

Colorado, 1♂, Paonia, July (G. E. Quinter) [U. S. N. M.]

Georgia, 1♂, no data [U. S. N. M.]

Massachusetts, 1♀, Brewster, June 25 1937 (Campau).

Michigan, 1♂, Stevensville, Berrien Co., May 29 1938 (C. W. Sabrosky).

New Jersey, 1♂, Rancocas Park, April 23 1925 (H. C. Hallock); 1♀, Delaware Water Gap, June 21 — (A. T. Slosson).

New York, 2♂, Babylon, Long Island, May 11 1935 (Blanton & Borders); 2♂, Selden, Long Island, May 12 1924; 7♂, Riverhead, Long Island, May 6 1923, 5♂, May 18 1923, 1♂, May 20 1923, 2♂, 1♀, May 27 1923, 1♂, May 29 1923, 3♂, 1♀, May 3 1927, 2♂, May 8 1927, 1♂, May 15 1927, 3♂, 4♀, May 22 1927, 2♂, May 4 1938.

Ontario, 1♂, Low Bush, Lake Abitibi, June 20 1925 (N. K. Bigelow).

Quebec, 1♀, Meach Lake, June 21 1916 (W. T. M. Forbes).

Texas, 2♂, College Station, April 13 1935 (H. J. Reinhard).

The species *marylandica* resembles the european form *Musca grisea* Fallén, from which it may be distinguished by the shorter arisal hairs, and by the absence of a robust apical posterodorsal bristle on fore tibia. Among North American species *marylandica* may be associated with *Hylemyia johnsoni* Stein on account of the longish arisal hairs and absence of prealar bristle, but the female of *marylandica* may be readily separated from that of *johnsoni* owing to the lack of a mid ventral bristle on mid tibia and by the broader frons, the latter being at least as wide as distance between the second pair of dorsocentral bristles. In the male the distinguishing characters can not be so readily defined owing to the marked extent of variation within *johnsoni*.

The male of *marylandica*, in common with the female, invariably possesses a more obliquely directed *m-cu* cross vein that not unusually divides the distal half of vein M_{1+2} into two nearly equal sections; whereas in *johnsoni* the cross vein is usually placed in a more upright position and the penultimate section of M_{1+2} is thereby noticeably shorter than the ultimate.

Leucophora sociata (Meigen)

Anthomyia sociata Meigen, Syst. Besch., 1826 V p. 98.

Hylemyia sociata Neuhaus, Diptera marchica, 1886 p. 224.

Hydrophoria sociata Stein, Kat. Paläark. Dipt., 1907 III p. 687.

Hammomyia gallica Schnabl and Dziedzicki, Abh. K. Leop.-Carol. Deutsch. Akad. Naturforsch., 1911 XCV Nr. 2 p. 236, 355.

Hammomyia sociata Stein, Arch. f. Naturgesch., 1916 (1915) LXXXI A heft 10 p. 163 . . . Collin, Trans. Ent. Soc. London, 1921 Pt. III p. 309 . . . Séguy, Faune de France, 1923 No. VI p. 72 . . . Karl, Tierwelt Deutschlands, 1928 XIII Pt. 3 p. 192.

Hylephila sociata Séguy, Gen. Insect., 1937 Fasc. 205 p. 138.

Records:—

Alberta, 1♂, Calgary, July 14 1923 (G. Salt).

British Columbia, 1♀, Oliver, May 30 1923, 1♀, June 3 1923, 1♀, Keremeos, June 27 1923 (C. B. D. Garrett); 1♂, Seton Lake, Lillooet, June 1 1926, 1♂, June 4 1926 (J. McDunnough).

California, 1♀, San Gabriel Canyon, Oct. 21 1929.

Colorado, 1♀, Tennessee Pass, 10240 ft. alt., July 11 — (J. M. Aldrich) [U. S. N. M.]

Idaho, 1♂, Mt. Moscow, July 12 1924, 2♂, Lake Waha, June 14 1930 (J. M. Aldrich); 2♂, Mts., Moscow, June 25 1920 (R. C. Shannon); 1♂, Emigration Canyon, Aug. 24 1934 (T.) O. Thatcher).

Manitoba, 1♀, Winnipeg, June 22 1927 (H. J. Brodie); 1♀, Aweme, Oct. 7 1924 (N. Criddle).

Maryland, 1♀, Plummers Island, June 22 1916 (A. K. Fisher).

New Hampshire, 1♂, Franconia, (A. T. Slosson).

Utah, 1♂, Uintah Mts., Tryol Lake, (J. C. Fechner).

Washington, 1♂, Ewan, June 13 1920 (R. C. Shannon); 1♂,

Asotin, April 15 1923, 1♀, May 20 1923 (Virgil Argo); 1♂, Mt. Rainier, Shadow Lake, 6200 ft. alt., July 29 1932, 1♂, July 31 1932; 1♂, Potlatch, May 28 1930 (J. M. Aldrich). [U. S. N. M.].

Wisconsin, 1♀, Fountain City, Buffalo Co., Aug. 12-17 1910.

The species *sociata* may be regarded as allied to *albiseta*, the darker forms of the latter superficially resembling this species. In *sociata* the bristles on antero- and posteroventral surfaces of hind femur are more robust than in *albiseta*, being abnormally stoutly developed in some specimens. There are also specific differences observable in the structure of male copulatory appendages (figs. 4, 9). In the female of *sociata* the palpi are narrowly spatulate, being pointed apicad.

Leucophora maculata (Stein)

Hammomyia maculata Stein, Berl. Ent. Zeitschr., 1898 (1897) XLII p. 229 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No. 1444 p. 554 . . . Malloch, Trans. Amer. Ent. Soc., 1918 XLIV p. 303 . . . Malloch, Canad. Ent., 1921 LIII p. 78 . . . Stein, Arch. f. Naturgesch., 1919 (1917) LXXXIII A heft 1 p. 152 . . . Stein, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84.

Hylephila maculata Séguy, Gen. Insect., 1937 Fasc. 205 p. 138.

Records:—

Alberta, 1♂, Wainwright, June 24 1938 (E. H. Strickland); 2♂, 1♀, Waterton, July 9 1923, 1♂, Lethbridge, July 6 1921 (H. L. Seamans).

British Columbia, 1♂, Lillooet, June 15 1917, 1♂, June 14 1917 (J. D. Tothill); 1♂, Chilcotin, July 26 1920 (E. R. Buckell).

California, 1♂, Corona, March 25 1932, 1♂, Riverside, March 14 1933, 1♂, March 30 1933, 2♂, April 10 1933, 1♂, April 1 1933, 1♂, April 3 1933 (A. J. Basinger).

Colorado 1♂, Florissant, June 19 — (Cockerell) [U. S. N. M.].

Idaho, 3♂, 1♀, Moscow, June 24 1912, 2♂, 1♀, June 16 1910 (U. S. N. M.); 1♂, McCall, June 22 1926, 10525 ft. alt.; 1♀, Fairfield, Aug. 27 1926 (R. W. Haegele).

Manitoba, 1♀, Balmoral, Aug. 24 1924 (A. J. Hunter).

- Montana, 1♀, Missoula, July 13 — (U. S. N. M.).
 North Dakota, 1♂, Mandan, June 16 1918 (U. S. N. M.).
 Oregon, 2♂, Hood River, no date (Childs).
 South Dakota, 1♂, Hot Springs, July 13 1924.
 Utah, 1♀, Payson, no date (M. H. Peterson).
 Washington, 1♂, Friday Harbor, June 19–26 1909; 2♂, 1♀,
 Lind, June 11 1919, 1♂, June 16 1919; 1♂, Edwall, July 8
 — (J. M. Aldrich) [U. S. N. M.]; 1♂, Ritzville, June 12
 1920, 1♀, Lake Paha, June 20 1920, 1♀, Sprague, June 20
 1920 (R. C. Shannon); 1♂, 1♀, Toppenish, June 19 1923,
 1♀, Mt. Rainier, White River, July 20 1924 (A. L. Melander).
 Wyoming, 1♂, Yellowstone Park, Madison Jnct., July 27 1923
 (A. L. Melander).

The species *maculata* is apparently western in its distribution, and does not occur in New York as previously recorded (Huckett 1924, Leonard 1928). The latter citations are based on a female specimen collected at Ithaca which agrees closely with the female cotype of Stein. Stein's female specimen is, in my opinion, not conspecific with the male cotype, and differs from the females of the above records in having recurrent spines on anal palpi, and in the spatulate form of oral palpi. In the above female specimens the terminal sclerites of the ovipositor have a characteristic padded or cushionlike appearance owing to the enlarged form and dense vestiture of the subanal plate; the recurrent spines are not developed (figs. 19, 20). The male of *maculata* may be distinguished by the notable series of long bristles arising from abdominal processes. The bristles are conspicuous on account of their ventral position. The species covers a wide range in general coloration and development of markings. Occasional specimens may possess a weak prealar bristle and three posterodorsal bristles on hind tibia.

Leucophora unilineata (Zetterstedt)

- Anthomyza unilineata* Zetterstedt, Ins. Lapp., 1838 p. 675.
Aricia unilineata Zetterstedt, Dipt. Scand., 1845 IV p. 1518.
Anthomyia unilineata Schiner, Faun. Austr., 1862 I p. 638.
Chortophila unilineata Meade, Entom. Month. Mag., 1882 XIX
 p. 146 . . . Meade, Descr. List Brit. Anth., 1897 II p. 44.

Hylephila unilineata Strobl, Verh. zool.-bot. Ges. Wien, 1893 XLIII p. 265 . . . Stein, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84 . . . Collin, Trans. Ent. Soc. London, 1921 (1920) Pt. III p. 311 . . . Séguy, Faune de France, 1923 No. VI p. 77 . . . Séguy, Compt. rend. Congrès Sociétés savantes 1925, 1926 p. 475 . . . Johnson, Occ. Pap. Boston Soc. Nat. Hist., 1925 No. VII p. 236 . . . Ringdahl, Ark. f. Zool., 1930, Bd. XXIA No. 20 p. 5 . . . Ringdahl, K. Svensk. Vetenskaps. Skrift. Naturskydds., 1931 Nr. 18 p. 18 . . . Séguy, Mem. Acad. Cienc. Exact. Fisico-Quim. Natur. Zarag., 1934 III p. 51 . . . Séguy, Gen. Insect., 1937 Fasc. 205 p. 139.

Hammomyia unilineata Stein, Berl. Ent. Zeitschr., 1898 (1897) XLII p. 230 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No. 1444 p. 554 . . . Stein, Kat. Paläark. Dipt., 1907 III p. 699 . . . Smith, Ann. Rept. N. J. State Museum 1909, 1910 p. 791 . . . Stein, Arch. f. Naturgesch., 1914 (1913) LXXIX A heft 8 p. 32 . . . Cole and Lovett, Proc. Cal. Acad. Sci., 1921 XI No. 15 p. 313 . . . Leonard, Mem. 101 N. Y. (Cornell) Agr. Exp. Station, 1928 (1926) p. 837 . . . Strickland, Canad. Journ. Research, 1938 Sec. D XVI p. 209.

Anthomyia (Hammomyia) buccata Pandellé not Fallén, Rev. ent. France, 1901 XX p. 301.

Records:—

Alberta, 1♀, Wabamun, April 21 1934, 2♂, 1♀, Edmonton, April 25 1937, 1♂, April 28 1937, 1♀, May 13 1937 (E. H. Strickland); 1♀, same locality, April 30 1937 (F. O. Morrison).

Manitoba, 1♂, Aweme, April 7 1935 (N. Criddle).

Michigan, 1♀, Grand Rapids, May 15 1937.

New York, 1♀, Sea Cliff, Long Island, April (N. Banks) [U. S. N. M.]; 2♀, Valley Stream, Long Island, April 27 1921; 1♂, Deer Park, Long Island, April 20 1935; 1♂, Dix Hills, Long Island, April 18 1935 (Blanton & Borders); 1♂, Riverhead, Long Island, April 28 1924, 1♂, 1♀, May 1 1927; 1♀, May 13 1923, 4♀, May 4 1926, 2♀, May 8 1926, 1♀, Sept. 12 1926; 1♂, Southold, Long Island, April 11 1925; 1♀, Ithaca, May 2 1900.

Wisconsin, 4♀, Madison, April 14 1936, 12♀, April 29 1936, 4♀, May 3 1936, 2♀, May 11 1936, 4♂, 2♀, Dane County, April 18 1937, 4♂, 4♀, May 1 1937, 3♂, 2♀, May 6 1937, 1♂, April 22 1937, 1♀, Devils Lake, May 7 1937 (F. M. Snyder).

The species *unilineata* may be distinguished from related forms in that the mid tibia possesses a weak bristle near middle of anteroventral surface. In both sexes the fore tibia has a robust posterodorsal apical bristle and interfrontalia a pair of weak cruciate setulæ. Collin (1921) has recorded that Stein in his monograph on the European Anthomyiidae appeared to have mistaken *obtusa* for *unilineata*, and that Schnabl and Dzedzicki in *Die Anthomyiden* have erroneously illustrated the copulatory appendages of *unistriata* as belonging to this species. I have also in a study of the Anthomyiinae of New York mistakenly represented the figures of the male genitalia of *obtusa* as belonging to *unilineata*.

Leucophora obtusa (Zetterstedt)

Anthomyza obtusa Zetterstedt, Ins. Lapp., 1838 p. 682.

Aricia obtusa Zetterstedt, Dipt. Scand., 1845 IV p. 1571.

Hylephila obtusa Stein, Arch. f. Naturgesch., 1920 (1918)

LXXXIV A heft 9 p. 84 . . . Collin, Trans. Ent. Soc. London, 1921 Pt. III p. 311 . . . Séguy, Faune de France, 1923 No. VI p. 76 . . . Séguy, Compt. rend. Congrès Sociétés savantes 1925, 1926 p. 475 . . . Johnson, Occ. Pap. Boston Soc. Nat. Hist., 1925 No. VII p. 236 . . . Karl, Tierwelt Deutschlands, 1928 XIII Pt. 3 p. 193 . . . Tiensuu, Acta Soc. Faun. Flor. Fenn., 1935 LVIII No. 4 p. 13 . . . Séguy, Gen. Insect., 1937 Fasc. 205 p. 138.

Hammomyia obtusa Leonard, Mem. 101 N. Y. (Cornell) Agr. Exp. Sta., 1926 (1924) p. 837 . . . Hallock and Parker, Circ. 103 N. J. Dept. Agr., 1926 p. 16.

Records:—

California, 1♀, Los Angeles Co., March (U. S. N. M.); 1♀, Artesia, Febr. 10 1935 (M. W. Stone); 1♂, Santa Cruz, April 1924 (Latta); 1♀, Cazadero, April 12 1918 (J. C. Bradley).

District of Columbia, 2♀, Washington, March 26 — (J. M. Aldrich) [U. S. N. M.].

- Idaho, 2♀, Moscow, May 6 1912 (U. S. N. M.); 1♂, Kendrick, April 1912 (U. S. N. M.).
- Illinois, 1♀, Algonquin (Coq.) [U. S. N. M.]; 1♀, Dubois, April 24 1914.
- Indiana, 2♂, Lafayette, no date, 1♂, May 10 1917, 5♂, 1♀, April 22 1917, 1♂, April 17 1916, 1♀, April 28 1916, 2♀, May 1 1915 (J. M. Aldrich), 1♂, same locality, April 21 1915 [U. S. N. M.].
- Kansas, 1♀, Ellsworth Co., May (R. H. Painter).
- Michigan, 1♂, Detroit, no date (Hubbard & Schwartz) [U. S. N. M.].
- Montana, 1♀, Gallatin Co., 4800 ft. alt., April 26 1902 (R. Benton).
- New York, 1♂, 5♀, Valley Stream, Long Island, April 27 1921; 1♀, Dix Hills, Long Island, May 19 1935, 1♀, Half Way Hollow Hills, Long Island, May 18 1935 (Blanton & Borders); 1♂, Yaphank, Long Island, May 3 1924; 2♂, 1♀, Riverhead, Long Island, May 13 1923, 1♀, May 8 1926; 1♀, Ithaca, no date, 1♀, April 16 1917 (R. C. Shannon); 1♂, Taughanick Falls, near Ithaca, April 21 1917 (R. C. Shannon).
- Ohio, 1♂, Marion, May 1 1915 (R. C. Smith).
- Oregon, 1♂, Kiger's Island, April 8 1930 (J. Wilcox); 1♀, Corvallis, March 27 1919 (A. L. Lovett), 1♀, April 8 1930 (J. Wilcox).
- Pennsylvania, 1♂, Harrisburg, April 1917, 1♀, April 1929 (W. R. Walton); 1♀, Allegheny, no date [U. S. N. M.].
- Quebec, 1♂, Mount Royal, April 12 — (J. Ouellet).
- Texas, 1♂, College Station, March 1 1937 (H. J. Reinhard).
- Utah, 1♂, Spanish Fork, no date (D. E. Hardy); 2♀, Logan Canyon, April 24 1938 (Wm. P. Nye).
- Virginia, 1♀, Great Falls, May 11 1917 (C. T. Greene).
- Washington, 18♂, 3♀, Pullman, May 3 1924, 2♂, 1♀, May 13 1923, 4♂, April 22 1923, 2♂, April 25 1924, 1♀, June 4 1925 (A. L. Melander); 1♀, Rainier National Forest, Sawmill Flat, May 26 1935 (J. Wilcox).
- Wisconsin, 2♂, Madison, May 5 1936, 1♀, May 11 1936, 2♂, April 29, 1936, 4♂, Dane County, May 6 1937, 1♂, May 10 1937, 1♂, Devils Lake, May 7 1937 (F. M. Snyder).

The species *obtusa* has undoubtedly been confused with *unilineata* and *unistriata* (Zetterstedt) in many local collections. Structurally the species resembles *unistriata* (= *paludis* Joh.), but *obtusa* is usually larger and typically is clothed with more abundant setulæ. In the above series of specimens there are few if any safe diagnostic characters that may serve usefully to separate the species from *unistriata*. The more satisfactory distinctions have been presented in the keys to species.

Collin (1921) has concluded that Stein's european records of *obtusa* do not refer to that species but to another for which he has proposed the name *personata*. I have also concluded from an examination of the specimen on which Stein⁹ based his record of *obtusa* in North America that the specimen does not probably belong to that species but is more likely conspecific with the form named herein as *fusca*.

Leucophora unistriata (Zetterstedt)

Anthomyza unistriata Zetterstedt, Ins. Lapp., 1838 p. 677.

Aricia unistriata Zetterstedt, Dipt. Scand., 1845 IV p. 1512.

Hammomyia unistriata Stein, Entom. Nachr., XVIII 1892 p. 325
 . . . Stein, Kat. Paläark. Dipt. 1907 III p. 700 . . . Knowlton, Trans. Utah Acad. Sci. Arts Letters, 1936 XIII p. 239
 . . . Strickland, Canad. Jour. Res., 1938 D XVI p. 209.

Hammomyia paludis Johannsen, Ent. News, 1917 XXVIII p. 323 . . . Malloch, Canad. Ent., 1921 LIII p. 78 . . . Hockett, Mem. 77 N. Y. (Cornell) Agr. Exp. Sta., 1924 (1923) p. 14.

Hylephila unistriata Collin, Trans. Ent. Soc. London, 1921 (1920) Pt. III p. 319 . . . Séguy, Faune de France, 1923 No. VI p. 77 . . . Séguy, Compt. rend. Congrès Sociétés savantes 1925, 1926 p. 475 . . . Karl, Tierwelt Deutschlands, 1928 XIII (3) p. 193 . . . Séguy, Gen. Insect., 1937 Fasc. 205 p. 139.

Records:—

Alberta, 2♂, Edmonton, May 10 1924, 1♂, May 9 1937, 3♂, 3♀, May 6 1924, 1♀, May 23 1937 (E. H. Strickland); 1♂, Edmonton, May 11 1938 (A. W. E. Eriksson); 1♀, same locality April 30 1937 (F. O. Morrison); 1♂, Wabamun, May 28 1936 (E. H. Strickland).

⁹ Stein, P. Nordamerikanische Anthomyiden, 2 Beitrag, Arch. f. Naturgesch., 1920 (1918) LXXXIV A heft 9 p. 84.

Indiana, 1♂, Lafayette, April 27 1918 (J. M. Aldrich) [U. S. N. M.].

Michigan, 1♀, Albion, May 16 1936, 1♂, E. Lansing, May 9 1937, 1♀, May 14 1937 (C. W. Sabrosky).

New York, 2♂, 1♀, Valley Stream, Long Island, April 27 1921; 2♀, Babylon, Long Island, May 10 1935 (Blanton & Borders); 1♀, Ithaca, April 30 1915, 1♀, April 25 1920, 1♂, April 29 1922; 1♂, 6-mile Creek, Ithaca, April 29 1922 (L. S. West); 1♂, Cayuta Lake, May 8 1935; 2♀, Danby, May 14 1916 (E. G. Anderson).

Nova Scotia, 1♂, Truro, June 24 1917, 1♀, June 18 1917; 1♂, Kentville, June 27 1917.

Washington, 1♂, Pullman, April 21 1924 (A. L. Melander).

The species comes closest to *obtusa*, but is usually smaller and of paler hue. The *m-cu* cross vein in *unistriata* is quite frequently more upright than in *obtusa*. In some male specimens of *unistriata* the prosternum may possess bristles. The species may usually be distinguished from *obtusa* and other related species by the characters given in the keys.

Collin (1921) is of the opinion that *unistriata* was included by Stein in his later European records under *inflata* Rondani, and that Schnabl and Dzedzicki have mistaken the species for *unilineata* Zett. Johnson¹⁰ and Leonard¹¹ have listed *paludis* Johannsen as a synonym of *obtusa* Zetterstedt. I have seen a female paratype of *paludis* in the collections of the United States National Museum that I regard as conspecific with *obtusa*, but the type specimens of *paludis* are, in my opinion, representative of *unistriata*.

Leucophora fusca new species

Male, parafrontals and parafacials silvery pruinose, cheeks reddish tinged; antennæ and palpi blackish, proboscis lightly pruinose; thorax and abdomen with dark reflections, the former subshining and with trace of three brownish vittæ, scutellum infuscated laterad; abdomen more densely pruinose, abdominal vitta brownish, paler on basal terga. Legs blackish, narrowly reddish at knees. Wings faintly tinged, lower calyptral scale whitish; halteres deep yellow with trace of reddish tinge.

¹⁰ Johnson, C. W. List of the diptera or two-winged flies. 15. Fauna of New England. Occ. Pap. Boston Soc. Nat. Hist., 1925 VII p. 236.

¹¹ Leonard, M. D. A list of the insects of New York. Mem. 101 N. Y. (Cornell) Agr. Exp. Sta., 1928 (1926) p. 837.

Frons at narrowest scarcely wider than breadth of third antennal segment, frontal bristles continued to ocellar callosity, cruciate setulæ present; buccal region strongly developed, parafacials wider ventrad, lower half of occipital region swollen, marginal bristles and vibrissæ not robust; arista subnude, proboscis slender; thorax with one or more pairs of presutural acrostical bristles, prealar bristle longish, notopleural callosity with setulæ, mesopleural setulæ invading the declivity dorsad of mesothoracic spiracle, scutellum setulose laterad, ventral bristle of caudal pair of sternopleurals weakly developed; abdomen stout, truncated, scarcely as long as thorax, processes short and blunt, sterna clothed with longish bristles, tergal marks slightly tapering toward caudal margin.

Fore tibia with two or more posteroventral bristles, apical anterodorsal robust, apical posterodorsal weak; mid tibia with a mid ventral bristle, one anterodorsal, one posterodorsal and two or more bristles on posterior surface, apical anterodorsal robust, apical posterodorsal weak; hind femur with a complete series of anteroventral bristles with a series of finer bristles on proximal half of posteroventral surface; hind tibia with three to five anteroventral bristles, four or five anterodorsal, three posterodorsal, four or five weaker posteroventral bristles. Wings with *m-cu* cross vein sinuate and markedly oblique; cell R_{5+6} slightly narrower distad. Length 9 mm.

Female similar to male, paler, width of frons as in male, marginal bristles of fifth abdominal tergum stoutly developed, ovipositor with a pair of short recurrent spines and numerous spinules on anal palpi. Fore tibia with a mid posterior and a weak anterodorsal bristle; mid tibia with a posteroventral bristle adjacent mid ventral bristle; hind femur with bristles on proximal half of antero- and posteroventral surfaces weaker, hind tibia with a series of three or more weak bristles on posteroventral surface.

Type, ♂ Mt. Moscow, Idaho, June 5 1930 (J. M. Aldrich) [U. S. N. M.].

Allotype, ♀ Lafayette, Indiana, May 14 1918 [U. S. N. M.].

Paratypes, ♂ Edmonton, Alberta, May 9 1937, ♀, Clymont, Alberta, May 24 1937 (E. H. Strickland) [C. N. C.].

Records:

Alberta, 1♂, Edmonton, May 13 1937 (F. O. Morrison).

Idaho, 7♂, Mt. Moscow, June 5 1930 (J. M. Aldrich) [U. S. N. M.].

Indiana, 1♂, Lafayette, April 26 — (U. S. N. M.), 2♀, same locality, May 14 1918 (U. S. N. M.).

Oregon, 1♂, Corvallis, June 2 1929 (John Wieting).

Washington, 4♂, Almota, May 20 1923 (A. L. Melander); 1♀, Sprague, June 13 1920, 1♀, Ewan, June 13 1920 (R. C. Shannon).

The species *fusca* resembles the European form *personata* Collin, from which it may be distinguished by the scutellar infuscation, weakly developed ventral bristle of caudal pair of sternopleurals, and by the presence of weak cruciate setulæ. This is the species recorded by me in error as *personata* in Strickland's list¹² of the dipterous flies occurring in Alberta. Another closely allied species is described as follows.

***Leucophora annexa* new species**

Male and female resembling *fusca*, differing in that the mesonotum has only a dorsocentral vitta, scutellum entirely pale grayish. In the male the lower sternopleural bristle of caudal pair is well developed and the processes are longer. Fore tibia with one or two posteroventral bristles, apical anterodorsal weak, mid tibia with a weak mid ventral bristle, hind femur with bristles on proximal half of posteroventral surface weaker and shorter, not as long as breadth of hind femur where situated, hind tibia with a weaker series of posteroventral bristles. In the female the lower sternopleural bristle of caudal pair is weakly developed, fore tibia lacks a mid posterior bristle as in *fusca* and has a weakly developed apical anterodorsal, apical posterodorsal absent, mid tibia with a stout mid ventral bristle, one anterodorsal, one posterodorsal and three posterior bristles, apical anterodorsal robust, hind femur with no series of bristles on posteroventral surface, hind tibia with one or two inconspicuous longer setulæ on posteroventral surface.

Type, ♂, Lind, Washington, May 30 1919 (F. W. Carlson); Allotype, ♀, Lewiston Hill, Idaho, May 31 1934 (A. L. Melander). In the collection of Dr. A. L. Melander.

Superficially *annexa* resembles a paler form of *fusca*, and in this respect conforms closely to the appearance of *personata* Collin. I have regarded the species as distinct from *personata* owing to the presence of cruciate setulæ, weaker series or lack of bristles on posteroventral surface of hind femur, and further owing to the greater length of abdominal processes in male. Since the mid ventral bristle on mid tibia of male is notably weak in the specimens examined I have included the species under both categories in the first couplet of the male key, lest additional specimens may show that this character is not dependable for comparative purposes.

¹² Strickland, E. H. An annotated list of the diptera (flies) of Alberta. Canad. Journ. Research, Sec. D XVI 1938 p. 209.

Genus *Proboscimyia* Bigot

- Proboscimyia* Bigot, Bull. Soc. Ent. France, 1883 No. 4 p. 30 . . .
 Hockett, Mem. 77 N. Y. (Cornell) Agr. Exp. Station, 1924
 (1923) p. 50 . . . Curran, Fam. Gen. N. A. Dipt., 1937 p.
 391.
- Proboscidomyia* Bigot, Ann. Soc. Ent. France, 1884 ser. 6 IV p.
 266 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No.
 1444 p. 548 . . . Stein, Arch. f. Naturgesch., 1919 (1917)
 LXXXIII A heft 1 p. 152 . . . Séguéy, Gen. Insect., 1937
 Fasc. 205 p. 128.
- Dolichoglossa* Stein, Berl. Ent. Zeitschr., 1898 (1897) XLII p.
 230 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No.
 1444 p. 554 . . . Williston, Man. N. A. Dipt., 1908 3rd ed.,
 p. 335.

Genotype *Proboscimyia siphonina* Bigot.

The genus is not to be readily distinguished from *Leucophora* as denoted by the adult flies. Nothing, as far as I am aware, is known concerning the habits of the species. The character that has served to distinguish the group has been the abnormally slender proboscis in the genotype. It is to me doubtful whether this character is of generic value in view of the fact that another species belonging to the genus occurs in North America whose proboscis is not abnormally slender. The lower calyptra in both species is protruded distinctly beyond margin of upper scale.

KEY TO SPECIES

- Distal section of proboscis longer than fore tarsus, oral vibrissæ shorter than palpi *siphonina* Bigot
 Distal section of proboscis not as long as fore tarsus, oral vibrissæ as long as or longer than palpi *brevis* n. sp.

Proboscimyia siphonina Bigot

- Proboscimyia siphonina* Bigot, Bull. Soc. Ent. France, 1883 No. 4 p. 30.
- Proboscidomyia siphonina* Bigot, Ann. Soc. Ent. France, 1885 ser. 6 V p. 267 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No. 1444 p. 548 . . . Stein, Arch. f. Naturgesch., 1919 (1917) LXXXIII A heft 1 p. 152 . . . Séguéy, Gen. Insect., 1937 Fasc. 205 p. 129.

Dolichoglossa americana Stein, Berl. Ent. Zeitschr., 1898 (1897) XLII p. 230, 286 . . . Aldrich, Misc. Coll. Smithsn. Inst., 1905 XLVI No. 1444 p. 554.

Records:—

Illinois, 1♂, 1♀, Carlinville (Robertson) [U. S. N. M.].

New Mexico, 1♂, Koehler, Aug. 12 1914, 1♂, no date (W. R. Walton), 2♀, Socorro, 1916 (Williston) [U. S. N. M.].

South Dakota, 1♀, Elmira (J. M. Aldrich), cotype of *Dolichoglossa americana* Stein, Lectotype [U. S. N. M.]; 1♀, Onida, July 12 1932 (G. B. Spawen).

Texas, 1♂, Comanche Co., June 8 1928 (V. A. Lityle); 1♀, Taylor, May 27 1929, 1♂, 1♀, Hidalgo Co., June 6 1930 (J. C. Gaines); 1♀, Bexar Co., June 8 1928, 1♂, 1♀, same locality, May 29 1932 (H. B. Parks); 1♂, College Station, May 25 1930, 1♀, same locality, May 29 1920 (H. J. Reinhard) [Texas A. & M.]; 2♀, no data, 1♂, Belfrage [U. S. N. M.].

All previous records have been credited to this species. I am however doubtful whether those of eastern regions may be unreservedly accepted as correct in view of the evidence provided by the material before me. The species *siphonina* is represented exclusively by specimens collected in western parts of North America, whilst in New York, Nova Scotia and the District of Columbia another species has made its appearance.

In *siphonina* the proboscis is much longer, oral vibrissæ weaker, palpi slightly longer and notopleural callosity typically more setulose than in the following species. In both forms the male lacks and the female possesses a mid ventral bristle on mid tibia. In the male of *siphonina* the processes have a chitinous callosity at middle of inner margin (fig. 25).

Proboscimyia brevis new species

Similar to *siphonina* Bigot, but having the parafrontal bristles and oral vibrissæ more robust; proboscis shorter, distal section scarcely as long as fore tarsus; palpi proportionately shorter; mesonotum with fewer accessory setulæ on notopleural callosity; notably so at basal region of posterior notopleural bristle; abdominal processes devoid of a chitinous callosity at middle of inner margin; bristling of legs in male as follows:—Fore tibia with one or two posteroventral bristles and a weak mid anterodorsal bristle; mid tibia with one anterodorsal, one posterodorsal and two posterior bristles; hind

femur with a complete series of anteroventral bristles and a weaker series of bristles on proximal half of posteroventral surface; hind tibia with two anteroventral, three anterodorsal and three posterodorsal bristles.

Female similar to male, with a series of fine recurrent spines on anal palpi of ovipositor; sternopleural bristles arranged 2:2, the lower bristles weakly developed; mid tibia with a strong anterodorsal and mid ventral bristle, hind femur with bristles on anteroventral surface much weaker proximad and those on posteroventral surface absent except for one at base, hind tibia with one or more weak bristles on posteroventral surface. Length, 6-8.5 mm.

Type and allotype, ♂ ♀, Babylon, Long Island, New York, Sept. 18 1937 (F. S. Blanton) [U. S. N. M.].

Records:—

District of Columbia, 1♀, Oct. (Coquillett) [U. S. N. M.].

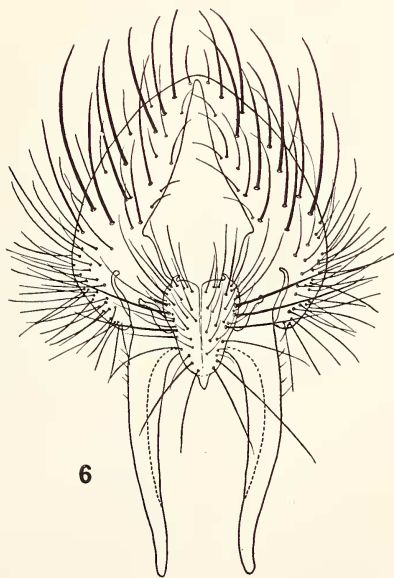
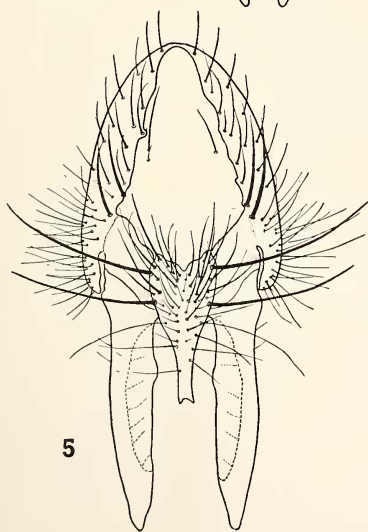
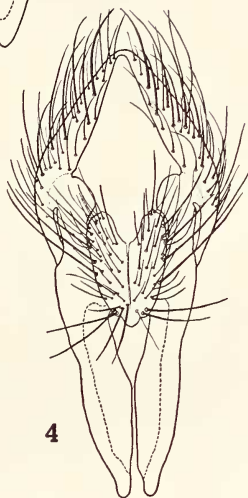
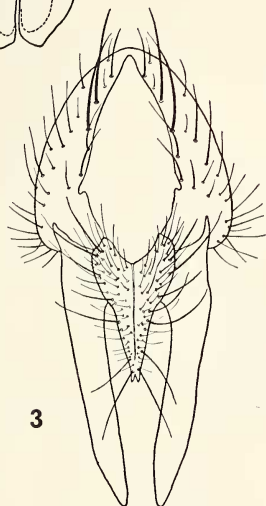
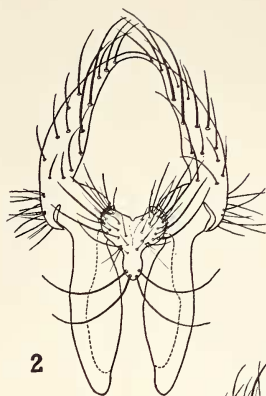
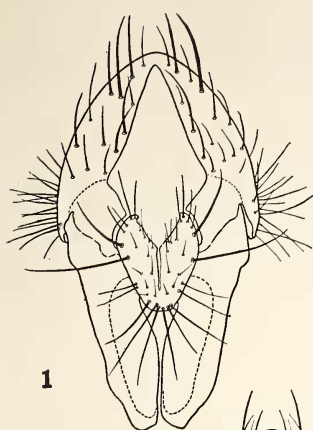
New York, 1♂, 1♀, Babylon, Long Island, Sept. 14 1933, 1♀, Aug. 15 1933, 1♂, 1♀, Sept. 12 1933, 1♂, Sept. 15 1937, 1♀, Sept. 23 1935, 1♀, Sept. 19 1935, 5♂, 1♀, Sept. 23 1933, 6♂, 4♀, Sept. 18 1937 (F. S. Blanton); 1♂, 1♀, Babylon, Long Island, Sept. 14 1935, 2♂, 1♀, Sept. 19 1934, 4♂, Sept. 12 1935, 1♂, Sept. 17 1935, 2♂, 1♀, Sept. 10 1935, 1♀, Sept. 7 1935 (Blanton & Borders); 1♀, Riverhead, Long Island, Sept. 21 1926.

Nova Scotia, 1♀, Truro, Sept. 15 1913 (R. Matheson).

PLATE XVII

Dorsal or caudal aspect of male copulatory appendages

- Figure 1. *Leucophora albiseta* (von Roser).
 Figure 2. *Leucophora maculata* (Stein).
 Figure 3. *Leucophora marylandica* (Malloch).
 Figure 4. *Leucophora sociata* (Meigen).
 Figure 5. *Leucophora fusca* new species.
 Figure 6. *Leucophora unilineata* (Zetterstedt).

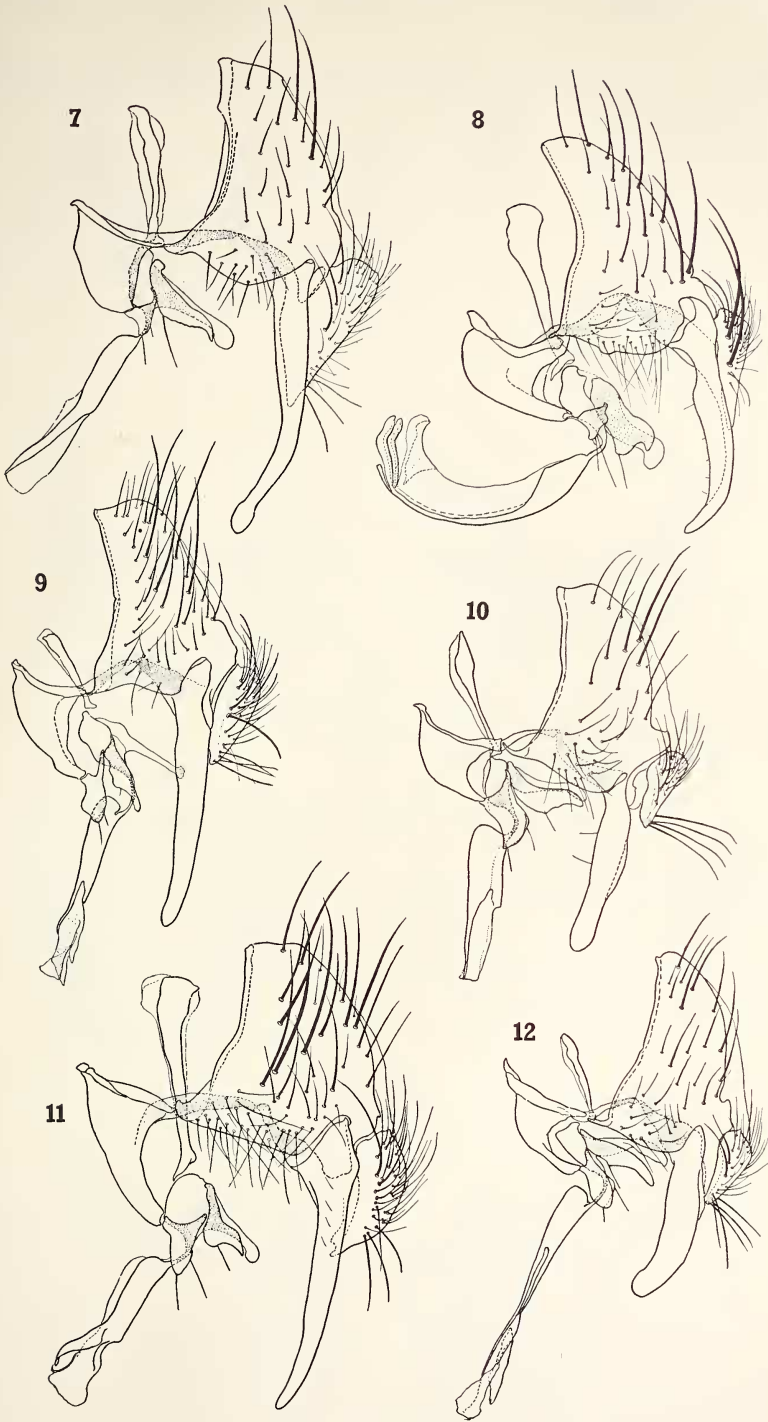


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PLATE XVIII

Lateral aspect of male copulatory appendages

- Figure 7. *Leucophora marylandica* (Malloch).
Figure 8. *Leucophora fusca* new species.
Figure 9. *Leucophora sociata* (Meigen).
Figure 10. *Leucophora maculata* (Stein).
Figure 11. *Leucophora unilineata* (Zetterstedt).
Figure 12. *Leucophora albiseta* (von Roser).



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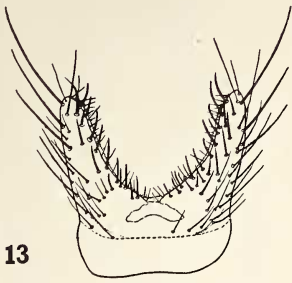
PLATE XIX

Ventral aspect of fifth abdominal sternum in male

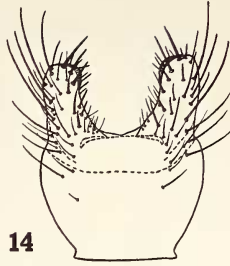
- Figure 13. *Leucophora albisetia* (von Roser).
Figure 14. *Leucophora marylandica* (Malloch).
Figure 15. *Leucophora sociata* (Meigen).
Figure 16. *Leucophora unilineata* (Zetterstedt).
Figure 17. *Leucophora maculata* (Stein).
Figure 18. *Leucophora fusca* new species.

Ovipositor of *Leucophora maculata* (Stein)

- Figure 19. Ventral aspect.
Figure 20. Dorsal aspect.



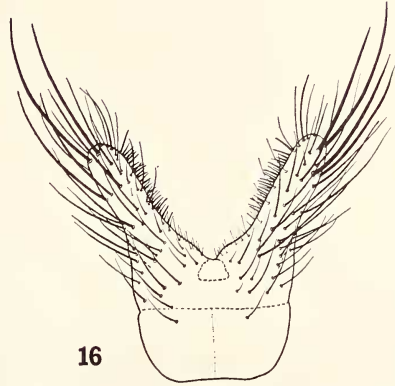
13



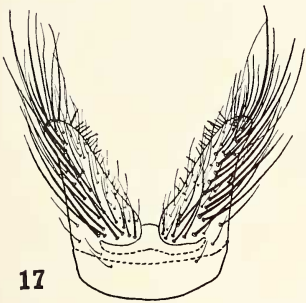
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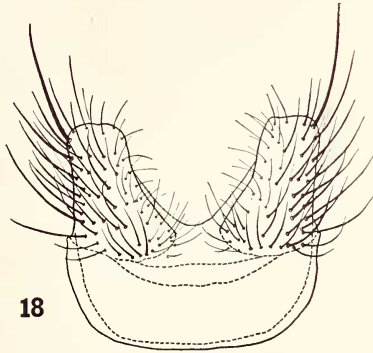
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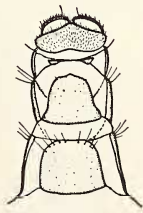
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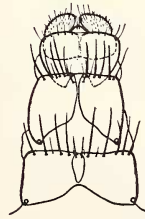
17



18



19



20

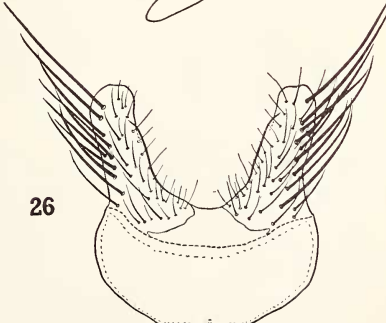
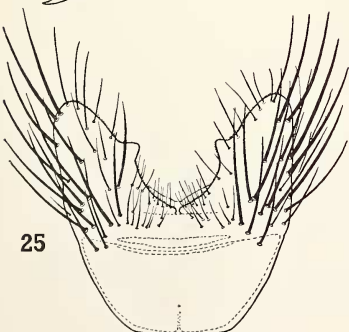
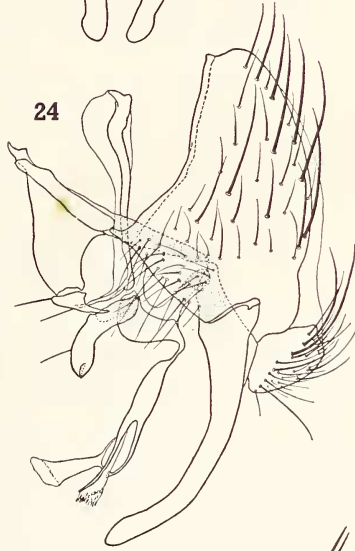
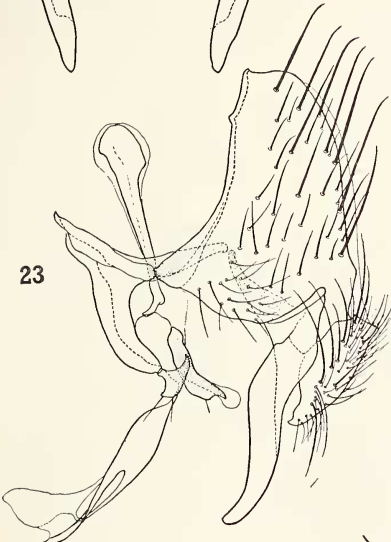
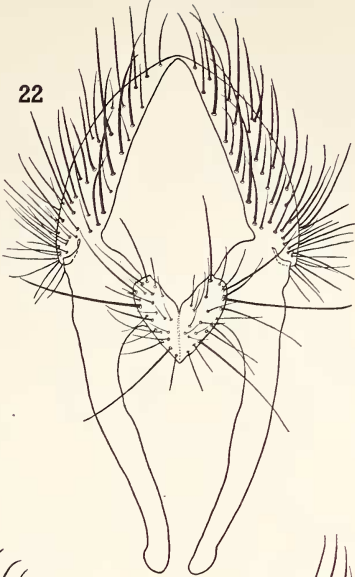
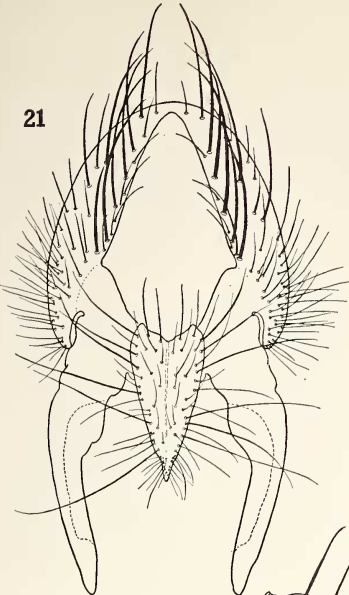
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PLATE XX

Male copulatory appendages of *Proboscimyia*

Figures 21, 23, 25. *Proboscimyia siphonina* Bigot.

Figures 22, 24, 26. *Proboscimyia brevis* new species.



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